

Trend Study 13B-9-05

Study site name: Steamboat East Bench.

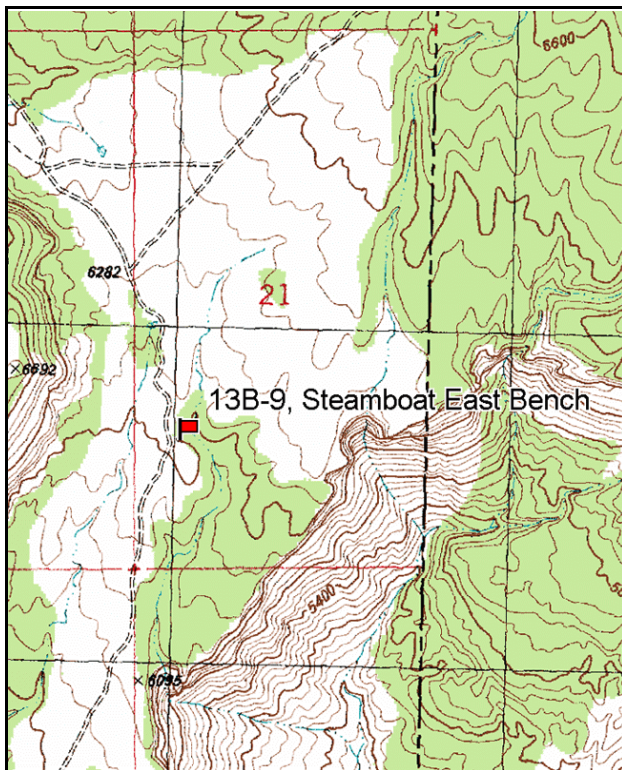
Vegetation type: Chained. Seeded P-J.

Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

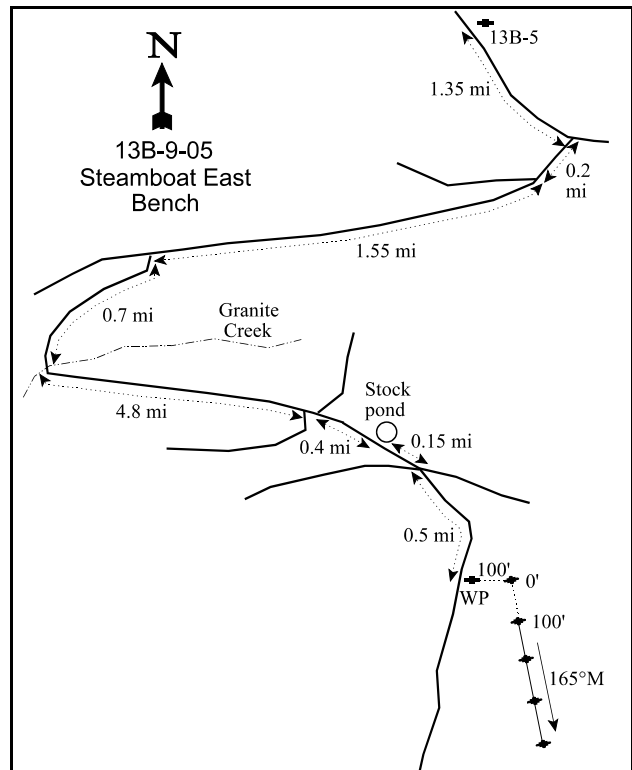
LOCATION DESCRIPTION

From the Buckhorn Draw transect (13B-5), continue southeast for 1.35 miles to the "Granary" intersection. Turn right and go 0.2 miles to a fork. Stay left. Go 1.55 miles and turn left. Go down this road 0.7 miles to Granite Creek. Cross the creek and proceed 4.8 miles to a fork. Stay left, then right at another fork which connects back to the main road, traveling 0.4 miles to a stock pond. Continue 0.15 miles to a fork with many branches (the right goes up on Steamboat Mesa). Stay on the same road (straight through the intersection and up a steep hill) for 0.5 miles to an old P-J chaining and a 2 ½ foot tall rebar witness post on the left, 6 feet off the road. The 0-foot end of the baseline is 100 feet east of the witness post and is marked by a rebar tagged #7890.



Map Name: Steamboat Mesa

Township 23S, Range 26E, Section 21



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4294655 N, 668020 E

DISCUSSION

Steamboat Mesa East Bench - Trend Study No. 13B-9

This study site is located on a narrow bench (one-half mile wide) below Steamboat Mesa, bounded on the west by the sheer sandstone cliffs of Steamboat Mesa and on the east by deep canyons of the Dolores River. The northern part of the bench was included in the 1968 Steamboat Mesa allotment chaining. The area supports a moderately dense stand of pinyon-juniper and a variety of shrubs and herbaceous plants. The site is on a moderately sloping ridge with a west-southwest exposure and an elevation of 6,200 feet. Drainage off the bench is to the south. The pellet group data in 2000 estimated 17 deer days use/acre (42 ddu/ha) and 7 elk days use/acre (17 edu/ha). In 2005, the pellet group data estimated 3 deer, 7 elk, and 5 cow days use/acre (6 ddu/ha, 18 edu/ha, and 13 cdu/ha).

The soil texture is a sandy clay loam with an effective rooting depth of about 12 inches. One limiting factor could be low amounts of phosphorus (2 ppm). Values below 6 ppm may hinder normal plant growth and development in wildland soils (Tiedemann and Lopez 2004). Erosion is evident in areas disturbed by roads. Overall, the vegetation and litter cover provide adequate soil protection. Some slight pedestaling around plants and large rocks was noted between the vegetation. In 2005, the erosion condition class determined soil movement as stable.

The site supports a variety of browse species. Preferred species include: Utah serviceberry, black sagebrush, Wyoming big sagebrush, true mountain mahogany and green ephedra. These species provided a total of only 4.4% cover for preferred browse in 1995, 4.1% in 2000, and 2.0% in 2005. The browse understory is beginning to show the effects of a dominating pinyon-juniper canopy cover which is now at over 28%. Most of these key browse species occur in low densities. True mountain mahogany has provided 2-3% cover, with a density between 120 to 240 plants per acre from 1995 to 2005. Mature plants are large, averaging over 5 feet in height making them partly unavailable to browsing. Use was light to moderate in 1995 and 2000, but moderate in 2005. Black sagebrush density was estimated at about 440 plants/acre from 1995 to 2005, with about 1% cover. It showed moderate to heavy use in 1986 and 1995, light use in 2000, and light to moderate use in 2005. It displayed good vigor and low decadence until 2005, when decadence increased greatly from 0 to 35%. The proportion of young plants was relatively stable, except for 2000 when few young individuals were present. Wyoming big sagebrush was also sampled at a low density of only 132 plants/acre in 1986, declined to only 40 in 2000, and no plants were sampled in 2005. The scattered Utah serviceberry was not encountered in the shrub density strips in 2000, but 20 plants/acre were sampled in 1995 and 2005. Some surrounding mature serviceberry plants measured for height/crown were large, averaging 9 feet tall with a crown measurement of 13 feet wide.

Pinyon and juniper trees dominate the site. In 2000, densities was estimated at 274 pinyon trees/acre and 63 Utah juniper trees/acre. In 2005, density declined to 184 pinyon trees/acre and 66 juniper trees/acre. Cover (line intercept method) was estimated at 12% for pinyon and 9% in 2000 for a total of 21%. In 2005, pinyon-juniper combined cover is more than 28%. This increased dominance could have a lot to do with the overall losses to preferred browse cover.

The herbaceous understory is diverse but not abundant. Crested wheatgrass is the most abundant perennial species with an average cover of about 3% cover. Cheatgrass has been the most abundant grass species, but has not dominated the site. In 2000, it was scarcely found, but was moderately abundant in 1995 and 2005. Total grass cover has averaged about 8% since 1995. Forbs provide little forage or ground cover and most are low growing life forms. Stemless goldenweed and rock goldenrod are the most abundant forbs on the site. Other common forbs include: hairy goldaster, tumble mustard, and Hood's phlox.

1986 APPARENT TREND ASSESSMENT

Currently, browse density and diversity is promising on this winter range. However, many of the more palatable shrubs have been heavily hedged and may be receiving too much pressure to continue in the community. The most obvious downward trend indicator is the gradual increase of the pinyon-juniper trees. Many of the pinyon are suffering from an unidentified disease (or possibly an herbicide), therefore increase is difficult to predict and will be interesting to follow the changes taking place. Other trend parameters such as form, vigor, and age class distribution for key species appear stable. The overall soil trend also appears stable.

1995 TREND ASSESSMENT

Bare ground has decreased since 1986 with only slight sign of erosion. Vegetation and litter offer good protection and contribute to a stable soil trend. The herbaceous understory is comprised primarily of grasses. This includes two annual and six perennial species, of which, cover is almost equally distributed (annuals 47% vs 53% perennial). Herbaceous understory is stable, although a better composition is desired. The extensive root systems of pinyon and juniper would be affecting the understory species by being more competitive for moisture. There are several different browse species, of which, broom snakeweed is the most abundant. This population does not appear to be expanding at this time, but are becoming slightly more robust. Both sagebrush populations show a decrease in percent decadence with a few plants being heavily hedged. This is most likely due to extended drought conditions, thinning out the sagebrush populations, and competition with the pinyon and juniper trees. This combined with light use of other palatable browse species, contributes to a stable browse trend. The Desirable Components Index rated this site as poor with a score of 12 due to low perennial grass cover, low perennial forb cover, no recruitment of shrubs, low browse cover, and low annual grass cover.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - stable (0)

winter range condition (DC Index) - Poor (12) Lower Potential scale

2000 TREND ASSESSMENT

Relative bare soil has remained fairly stable since 1995 with only almost no sign of erosion. There have been increases in both vegetation and litter cover. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground decreased slightly. The herbaceous understory is comprised primarily of grasses. This includes mostly perennial species (crested wheatgrass, purple three-awn, galleta, and Indian ricegrass) which makes up more than 98% of the grass cover. At this time, annuals only make up less than 1% of the grass cover. Herbaceous understory is slightly down due to a slight decrease in sum of nested frequency for perennial grasses and a large decrease in the nested frequency of perennial forbs. The extensive root system of pinyon and juniper is affecting the understory species by being more competitive for moisture. This is especially true for this last year of drought. There are several different browse species, of which, broom snakeweed is still the most abundant. This population does not appear to be expanding at this time as its density is down slightly from 1995. Both sagebrush populations continue to show a decrease in percent decadency (0% in 2000). Black sagebrush and Wyoming big sagebrush are a minor component as together they only make up 5% of the browse cover. With a pinyon-juniper density of 337 trees/acre, the preferred browse will never be an important winter forage component until the competitive tree overstory is thinned. Seventy-six percent of the total browse cover comes from pinyon and juniper trees, making it difficult for any browse species to do well in this community. Browse trend is slightly down. The Desirable Components Index rated this site as fair to poor with a score of 25 due to moderate perennial grass cover, low perennial forb cover, no recruitment of shrubs, low browse cover, and low annual grass cover.

TREND ASSESSMENT

soil - stable (0)

browse - slightly down (-1)

herbaceous understory - slightly down (-1)

winter range condition (DC Index) - Fair to Poor (25) Lower Potential scale

2005 TREND ASSESSMENT

The trend for soil is slightly down. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground declined very slightly. The relative bare ground increased from 22% to 33%. The trend for browse is stable. Black sagebrush density was stable, but percent decadence increased. True mountain mahogany density increased as many young plants were sampled. Broom snakeweed density was down by nearly half after many dry years. Pinyon and juniper density was also down, due likely to drought conditions. Overall this leads to a stable trend. The trend for herbaceous understory is slightly up. The nested frequency of perennial grasses, the most important component of the herbaceous understory increased 11%. The nested frequency of perennial forbs increased over 200%, but this has less impact on the trend because forb frequencies generally fluctuate more than grasses and are of less importance to the winter range. Cheatgrass also increased substantially, but does not dominate the site. The Desirable Components Index rated this site as poor with a score of 19 due to moderate perennial grass cover, low perennial forb cover, no recruitment of shrubs, low browse cover, and low annual grass cover.

TREND ASSESSMENT

soil - slightly down (-1)

browse - stable (0)

herbaceous understory - slightly up (+1)

winter range condition (DC Index) - Poor (19) Lower Potential scale

HERBACEOUS TRENDS --

Management unit 13B, Study no: 9

Type	Species	Nested Frequency				Average Cover %		
		'86	'95	'00	'05	'95	'00	'05
G	Agropyron cristatum	_a 63	_b 106	_{ab} 96	_{ab} 80	2.00	5.21	2.82
G	Aristida purpurea	_a -	_b 16	_b 13	_{ab} 12	.40	.84	.33
G	Bromus tectorum (a)	-	_c 243	_a 6	_b 139	3.00	.09	2.62
G	Hilaria jamesii	_a -	_{ab} 14	_b 18	_b 19	.48	1.01	1.24
G	Oryzopsis hymenoides	_b 29	_a 17	_a 11	_a 6	.46	.68	.19
G	Poa fendleriana	_b 15	_b 15	_a -	_b 10	.03	-	.19
G	Poa secunda	_a -	_a -	_{ab} 2	_b 11	-	.00	.20
G	Sitanion hystrix	_b 62	_a 7	_a 4	_a 21	.04	.04	.45
G	Stipa comata	-	-	-	2	-	-	.00
G	Vulpia octoflora (a)	-	_{ab} 4	_a -	_b 12	.01	-	.02
Total for Annual Grasses		0	247	6	151	3.01	0.09	2.64
Total for Perennial Grasses		169	175	144	161	3.43	7.80	5.44
Total for Grasses		169	422	150	312	6.45	7.89	8.09
F	Artemisia dracunculus	-	-	-	7	-	-	.01

Type	Species	Nested Frequency				Average Cover %		
		'86	'95	'00	'05	'95	'00	'05
F	<i>Arabis drummondi</i>	-	9	-	-	.02	-	-
F	<i>Astragalus convallarius</i>	-	-	-	9	-	-	.30
F	<i>Astragalus mollissimus</i>	_b 15	_{ab} 10	_a -	_b 10	.05	-	.07
F	<i>Astragalus</i> sp.	-	4	-	-	.01	-	-
F	<i>Calochortus nuttallii</i>	-	5	-	2	.01	-	.00
F	<i>Chenopodium fremontii</i> (a)	-	-	-	2	-	-	.00
F	<i>Cryptantha</i> sp.	_a -	_b 23	_a -	_b 12	.06	-	.08
F	<i>Cymopterus</i> sp.	_a -	_b 16	_a -	_a 5	.04	-	.02
F	<i>Descurainia pinnata</i> (a)	-	_a -	_a -	_b 17	-	-	.23
F	<i>Draba nemorosa</i> (a)	-	_a 4	_a -	_b 68	.01	-	.29
F	<i>Erodium cicutarium</i> (a)	-	_{ab} 18	_a 5	_b 34	.04	.01	.22
F	<i>Erigeron pumilus</i>	2	-	-	-	-	-	-
F	<i>Euphorbia</i> sp.	_b 13	_a 4	_a -	_a -	.01	-	-
F	<i>Gilia hutchinifolia</i> (a)	-	_b 28	_a -	_c 53	.08	-	.26
F	<i>Haplopappus acaulis</i>	_c 70	_b 31	_b 29	_a 3	.39	.24	.04
F	<i>Heterotheca villosa</i>	-	12	4	4	.16	.15	.01
F	<i>Hymenoxys acaulis</i>	-	-	5	4	-	.06	.01
F	<i>Lappula occidentalis</i> (a)	-	_a 2	_a -	_b 10	.00	-	.02
F	<i>Lactuca serriola</i>	-	1	-	-	.00	-	-
F	<i>Lepidium densiflorum</i> (a)	-	-	-	1	-	-	.01
F	<i>Lesquerella ludoviciana</i>	10	-	-	-	-	-	.00
F	<i>Lithospermum</i> sp.	-	2	-	-	.00	-	-
F	<i>Lychnis drummondii</i>	_a -	_a 11	_a -	_b 101	.02	-	2.25
F	<i>Machaeranthera grindelioides</i>	10	-	-	3	-	-	.00
F	<i>Medicago sativa</i>	-	-	-	-	.01	-	.00
F	<i>Penstemon</i> sp.	3	5	-	2	.04	-	.01
F	<i>Petradoria pumila</i>	28	14	16	13	.47	1.12	.50
F	<i>Phlox hoodii</i>	_b 25	_a 11	_{ab} 10	_{ab} 18	.05	.07	.25
F	<i>Physaria</i> sp.	1	-	-	-	-	-	-
F	<i>Sisymbrium altissimum</i> (a)	_a 1	_b 13	_a -	_a 2	.03	-	.00
F	<i>Streptanthus cordatus</i>	-	7	-	8	.02	-	.10
F	<i>Townsendia incana</i>	3	-	-	-	-	-	-
F	<i>Tragopogon dubius</i>	_b 17	_a 3	_a -	_a -	.00	-	-
Total for Annual Forbs		1	65	5	187	0.16	0.00	1.05
Total for Perennial Forbs		197	168	64	201	1.40	1.66	3.71
Total for Forbs		198	233	69	388	1.57	1.67	4.76

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 13B, Study no: 9

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	Amelanchier utahensis	1	0	1	-	-	-
B	Artemisia nova	13	13	12	.85	1.00	.37
B	Artemisia tridentata wyomingensis	5	1	0	.18	.15	-
B	Cercocarpus montanus	10	5	9	3.25	2.76	1.58
B	Ephedra viridis	1	1	1	.15	.15	.03
B	Gutierrezia sarothrae	30	32	21	.71	1.28	.76
B	Juniperus osteosperma	0	7	8	2.95	5.73	3.52
B	Opuntia sp.	1	2	1	-	.03	.15
B	Pinus edulis	0	16	16	11.50	12.08	5.91
B	Sclerocactus sp.	1	5	2	.00	.06	.00
B	Symphoricarpos oreophilus	1	1	2	.15	.15	.15
B	Yucca harrimaniae	1	2	1	.00	.00	-
Total for Browse		64	85	74	19.75	23.42	12.49

CANOPY COVER, LINE INTERCEPT --

Management unit 13B, Study no: 9

Species	Percent Cover	
	'00	'05
Amelanchier utahensis	-	1.39
Artemisia nova	-	.66
Cercocarpus montanus	-	3.08
Ephedra viridis	-	.26
Gutierrezia sarothrae	-	.68
Juniperus osteosperma	9.00	10.44
Opuntia sp.	-	.05
Pinus edulis	12.19	17.83
Sclerocactus sp.	-	.03
Symphoricarpos oreophilus	-	.23

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 13B, Study no: 9

Species	Average leader growth (in)
	'05
Cercocarpus montanus	3.1

POINT-QUARTER TREE DATA --

Management unit 13B, Study no: 9

Species	Trees per Acre	
	'00	'05
Juniperus osteosperma	63	66
Pinus edulis	274	184

Average diameter (in)	
'00	'05
4.9	8.2
2.4	3.9

BASIC COVER --

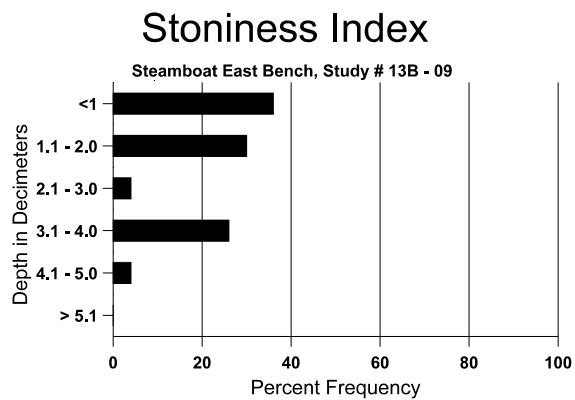
Management unit 13B, Study no: 9

Cover Type	Average Cover %			
	'86	'95	'00	'05
Vegetation	2.00	27.71	32.60	22.95
Rock	7.00	15.66	11.94	11.42
Pavement	1.75	.52	6.53	1.84
Litter	55.50	41.47	50.87	37.79
Cryptogams	1.00	.80	1.73	.43
Bare Ground	32.75	26.00	28.85	37.29

SOIL ANALYSIS DATA --

Herd Unit 13B, Study # 9, Study Name: Steamboat East Bench

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
11.7	63.4 (13.2)	7.3	57.6	17.1	25.2	2.0	2.0	80.0	0.6



PELLET GROUP DATA --

Management unit 13B, Study no: 9

Type	Quadrat Frequency		
	'95	'00	'05
Rabbit	17	15	28
Elk	9	-	8
Deer	6	10	16
Cattle	-	1	2

Days use per acre (ha)	
'00	'05
-	-
7 (19)	7 (18)
17 (42)	3 (6)
-	5 (13)

BROWSE CHARACTERISTICS --

Management unit 13B, Study no: 9

		Age class distribution (plants per acre)					Utilization					
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	20	40	20	-	-	-	0	0	-	-	0	119/169
00	0	-	-	-	-	-	0	0	-	-	0	109/167
05	20	-	20	-	-	-	0	0	-	-	0	89/119
Artemisia nova												
86	1199	-	366	433	400	-	50	6	33	3	6	8/11
95	440	40	120	300	20	120	55	18	5	-	0	10/18
00	440	-	20	420	-	180	5	0	0	-	0	7/17
05	400	40	40	220	140	220	5	20	35	-	0	9/21
Artemisia tridentata wyomingensis												
86	132	-	33	33	66	-	50	25	50	15	25	5/7
95	120	-	20	60	40	40	0	33	33	-	0	14/22
00	40	-	-	40	-	60	0	100	0	-	0	9/17
05	0	-	-	-	-	-	0	0	0	-	0	14/20
Atriplex canescens												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	31/39
Cercocarpus montanus												
86	0	-	-	-	-	-	0	0	0	-	0	-/-
95	240	40	120	100	20	20	8	0	8	8	8	68/94
00	120	-	40	60	20	20	17	0	17	-	0	74/92
05	240	-	160	40	40	20	42	8	17	8	8	55/59

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Chrysothamnus nauseosus hololeucus												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	43/56
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	-/-
Ephedra viridis												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	20	-	-	20	-	-	0	0	-	-	0	34/35
00	20	-	-	20	-	-	0	0	-	-	0	33/57
05	20	-	-	20	-	-	100	0	-	-	0	33/57
Gutierrezia sarothrae												
86	1566	-	233	1300	33	-	0	0	2	-	0	8/10
95	1680	260	140	1480	60	80	0	0	4	1	1	9/13
00	1300	-	40	880	380	560	0	0	29	23	29	6/11
05	700	20	60	620	20	-	0	0	3	3	3	15/23
Juniperus osteosperma												
86	0	33	-	-	-	-	0	0	0	-	0	-/-
95	0	-	-	-	-	-	0	0	0	-	0	-/-
00	140	-	20	120	-	-	0	0	0	-	0	-/-
05	160	-	40	100	20	40	0	0	13	-	0	-/-
Opuntia sp.												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	20	-	-	20	-	-	0	0	-	-	0	3/11
00	40	-	-	40	-	-	0	0	-	-	0	3/12
05	40	-	-	40	-	-	0	0	-	-	0	3/13
Pinus edulis												
86	333	-	100	200	33	-	0	0	10	6	10	81/39
95	0	20	-	-	-	-	0	0	0	-	0	-/-
00	460	20	240	220	-	-	0	0	0	-	0	-/-
05	460	-	160	300	-	160	0	0	0	-	0	-/-
Purshia tridentata												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	34/48

		Age class distribution (plants per acre)					Utilization					
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Sclerocactus sp.												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	40	-	20	20	-	-	0	0	-	-	0	11/8
00	160	-	-	160	-	-	0	0	-	-	0	5/7
05	40	-	-	40	-	40	0	0	-	-	0	5/6
Symphoricarpos oreophilus												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	20	-	-	20	-	-	0	0	-	-	0	30/57
00	20	-	-	20	-	-	0	0	-	-	0	-/-
05	100	-	-	100	-	-	0	0	-	-	0	32/59
Yucca harrimaniae												
86	832	-	233	566	33	-	0	0	4	2	4	12/16
95	20	-	-	20	-	-	0	0	0	-	0	4/2
00	40	-	40	-	-	20	0	0	0	-	0	12/13
05	20	-	-	20	-	-	0	0	0	-	0	11/15